WESTERN UPDATE #69

THE WESTERN NEWSLETTER FOR MF, LF, AND VLF EXPERIMENTERS

Available for business-size 25 cent SASE's, plus $1 per issue (or $10 per year)
from: Jim Ericson, 226 Charles St., Sunnyvale, CA 94086-6063

ACTIVE EXPERIMENTAL BEACON STATUS (LIST COMPILED DECEMBER 9, 1989)

FREQ(kHz)	IDENT	LOCATION	SCHEDULE INFORMATION
163.80	FPV	Granada Hills, CA	Weekends. See alt. freq. 182.62 kHz.
166.503	C	Near Morro Bay, CA	24h/7d.
169.96	NRE	San Diego, CA	24h/7d.
171.139	K	Mountain View, CA	24h/7d.
175.225	MAX	Wheatland, WY	24h/7d CW. BPSK/ASCII by request.
175.703	FAW	Orem, UT	24h/7d.
176.26	CO	Glenwood Springs, CO	24h/7d.
176.85	7FS	Belfair, WA	24h/7d.
177.75	CT	Pleasant Gap, PA	10 baud BPSK. Status unknown.
178.62	**DJ**	**Los Banos, CA**	**24h/7d. Dave Johnson, New Beacon.**
179.0	MPM	Salt Lake City, UT	24h/7d. ASCII/CW alternating 5 minutes.
179.54	WJ	Arleta, CA	On, but intermittent.
180.224	F	Los Banos, CA	FSK. By request.
180.80	XU	Sioux Falls, SD	24h/7d. BPSK/CW alternating 5 minutes.
181.17	IZJ	San Gabriel, CA	Daily. Silent 0700 to 1100 UTC.
182.62	FPV	Granada Hills, CA	Weekends See alt. freq. 163.80 kHz.
182.672	G	Palo Alto, CA	24h/7d.
182.88	H2	Descanso, CA	24h/7d.
183.160	PRK	Saratoga, CA	24h/7d. K6PRK.
183.544	MEL	San Jose, CA	24h/7d.
183.63	PLI	Burbank, CA	Big signal, but intermittent schedule.
183.74	ZI	San Jose, CA	24h/7d. Frank Butscher W6SZS.
184.016	EK	Sunnyvale, CA	24h/7d. **Some outage for solar recording.**
184.383	TI	Kingman, AZ	24h/7d.
184.39	HO	Pahoa, HI	By request.
184.46	B	Fresno, CA	24h/7d.
185.0	ZYK	Redway, CA	24h/7d.
186.80	BA	Lancaster, IL	24h/7d.
187.0	ELU	Simi Valley, CA	24h/7d. Saturday and Sunday A.M. on SSB.
187.2	**CAT**	**Cincinatti, OH**	**24h/7d. Dave Raney. Note QSY & new ident.**
187.252	TEXAS	NW of Ft. Worth, TX	24h/7d.
187.50	DCH	Berlin, MD	Schedule unknown.
187.77	AZ	Tucson, AZ	24h/7d. Alt. Freq. = 185.49 kHz.
190.4	OHH	Richmond Hill, Canada	Occasional testing.
525.+/-.76	T (dashes)	Sunnyvale, CA	A2 mod 24h/7d. Ed Gelinas.
1619.92	D	Salt Lake City, UT	24h/7d morse/FSK. Mark Mallory.
1620.08	U	Salt Lake City, UT	24h/7d morse/FSK. Mark Mallory.
1624.75	CT	Pleasant Gap, PA	24h/7d. 5 baud CCW. Clint Turner.
1637.93	**RR (daid)**	**San Rafael, CA**	**Sunset to Sunrise. Steve McGreevy. New!**
1650.62	G4	Palo Alto, CA	24h/7d. Herb Vanderbeek.
1650.67	TI	Kingman, AZ	24h/7d. Rex Wilson.
1655.5	CO	Glenwood Springs, CO	24h/7d. Bob Cutter.
1661.35	U	San Diego, CA	Nites only. Steve Meyerpeter, KG6BY
1687.33	**SD (daid)**	**Descanso, CA**	**6PM to 6AM daily . Frank Cathell. New ident.**
1688.25	TUS	Tucson, AZ	24h/7d. KD7QK.
1689.1	AZ	Tucson, AZ	24h/7d. Greg Farkas.

LOTS MORE SASES ON FILE

Non-Western listings are beacons currently being copied in the West, or they have SASE's on file with us. **Bold entries indicate recent changes, or new beacons.**

VLF PROJECT *ACTIVE*--- WHAT IS IT AND WHERE IS IT?

A SUMMARY TO-DATE

by: Jim Ericson

On September 28, 1989, the Soviet Union launched two satellites as part of an international research program called *ACTIVE*. The Soviet Space Research Institute (IKI) was responsible for the initiation. In the USA, NASA is coordinating scientific support. One of the two satellites (named INTERCOSMOS 24/*ACTIVE*) has a 10 kW transmitter on board which uses a 20 meter diameter loop antenna to radiate electromagnetic waves at frequencies near 10 kHz. The second, or sub-satellite (named CZACK) is intended as a monitoring platform which is mobile with respect to the VLF transmitter on the main satellite, INTERCOSMOS 24/*ACTIVE* .

Scientists know that the earth's magnetic field, ionosphere and atmosphere affect the magnitude and distribution of radio energy propagating in the magnetosphere, and within the earth's ionospheric waveguide. The exact nature of these interactions is not well understood, and the *ACTIVE* program should help us understand them better.

The plan is that the *ACTIVE* satellite will make a series of scheduled pulsed transmissions (typically CW "dashes", sometimes as long as 4 seconds each) over various parts of the earth at specific times. The CZACK sub-satellite and ground-based listening stations using broadband receivers will monitor, attempting to hear the transmissions plus any "triggered emissions". Triggered emissions are those which appear to be clearly associated with a triggering source. Manmade VLF signals, lightning, and nuclear explosions may all serve as triggers.

NASA/TRW/Stanford University have set up monitoring stations in Quebec, Antarctica, Stanford California, Los Angeles, Ithaca New York, New Hampshire, and Sondrestromfjord Greenland. The receiving equipment involves basically a high-class audio amplifier with filtering, connected to a large wire loop antenna. Obviously, to compare reception results or to seek confirmation of triggered emissions between several listening stations, the time must be pinned down to better than plus-or-minus one second. One approach to this is to tape WWV time signals on one channel of a stereo tape, and use the second track for the receiver audio. An easier approach which doesn't require a two-channel recorder is to simply tape the WWV minute announcement and time mark at the beginning and end of the tape run. The Omega 10.2 kHz navigational signals which will be heard on the tape in between the WWV announcements will give time references with atomic clock precision.

NASA, TRW, and IKI have all approved a TRW-sponsored project which will allow USA high school science classes to participate in *ACTIVE* data collection over the next few months. They will produce baseband cassette recordings using a receiver/antenna kit provided at nominal cost by TRW. All submitted tapes will be reviewed by project Scientists. In principle, there appears to be no objection to other amateur observers (like us!) to tag along on the coattails of this program. Thanks to TRW, a computer bulletin board exists which is accessible by all Experimenters and Scientists -- giving daily information about satellite transmission schedules.

Experimenter Michael Mideke of San Simeon, California, became interested in *ACTIVE* project participation several months ago. He went to the trouble of making contacts at TRW and Stanford University, and designed his own VLF receiver for use on his low-noise rural site. He has recently published several articles on the subject in THE LOWDOWN, WESTERN UPDATE, and NORTHERN OBSERVER.

On November 14th, Mike and I visited STARLab at Stanford University in Palo Alto at the invitation of Scientists there who had heard of Experimenter interest in *ACTIVE*. The Stanford folks spent the better part of the day giving us a briefing on satellite status, and gave us a most fascinating tour of their laboratories and listening facilities. Quiet listening sites and lots of patient organizing will be key to successful ground-based listening. It may well be that some Experimenters will be able to make significant contributions to Project *ACTIVE* research (and possibly other future projects as well).

So, where is the *ACTIVE* project today? Well, *ACTIVE* has not fared very well since its successful launch on September 28th. The transmitting loop failed to deploy properly, ending up in what Scientists think is a figure-8 configuration! This raised the system's resonant frequency to around 15 kHz. Unfortunately, the transmitter is not synthesized, and can operate only up to 10.537 kHz. Unless the loop can be repaired, we can assume all transmissions will take place on this frequency. The effective radiated power as a result of high SWR will be much lower than planned. Scientists don't really know what to expect. The power reduction doesn't necessarily mean that the satellite will fail to trigger emission phenomena, but one would suspect the results at low power to be more sensitive to prevailing conditions than would have been the case with high power.

Reports from Stanford/TRW in early December indicate that the listening sub-satellite CZACK is basically kaput! Seems that only one of four solar panels deployed. With CZACK apparently out of action, the role of ground stations becomes increasingly important.

The *ACTIVE* satellite has already made several transmission schedules over Quebec (late November, early December). The West Coast listening site near Stanford University in California should be on-line by mid-December, and it is expected that West-Coast passes of *ACTIVE* will be requested of the Soviets soon thereafter.

Mike Mideke points out that transmission schedules are very short. This is <u>not</u> a random listening project! Transmission schedules from the power-limited satellite will typically be six-minute sessions, which may be separated by many hours, days, or even weeks. Even within each six-minute transmission window, the transmissions may only occupy 48 seconds. To be effective, listeners will need daily computer bulletin board access.

To-date there are only a few US Experimenters with the interest, time, equipment, and site prepared to actively participate in *ACTIVE* listening. For this reason, I have not included any details of the project or bulletin board access in this article. My personal role in all of this is to support Mike and other interested Experimenters with communications and information. I will try to keep in contact with the bulletin board, and with Scientists at Stanford and TRW.

If you are interested in *ACTIVE* <u>participation</u> and desire more detailed information, please contact me directly by telephone at my home (408) 773-8947). <u>I will not have time to answer any correspondence on the subject, however</u>. Otherwise, I'll continue to keep all of you updated on progress of the project in subsequent editions of WESTERN UPDATE.

Bibliography

<u>Sounds of Natural Radio</u>. THE LOWDOWN (June, August, September, November 1989). Mike Mideke.

<u>Space Project Activnyi</u>. WESTERN UPDATE #67, and THE LOWDOWN (October 1989). Mike Mideke.

<u>Project Active Update</u>. WESTERN UPDATE #68, and THE NORTHERN OBSERVER, Issue #13. Mike Mideke.

<u>FINAL NOTES ON THE WAY TO THE COPY STORE DECEMBER 10TH!</u>

Some absolutely incredible propagation occurred last night and today on VLF! My chart recorder on 76.2 kHz went completely off scale last night. Mike Mideke reports that about 0430 UT December 10th he heard WI in Maryland and KRY in Ohio! He also heard MAX louder that he has ever heard him, and all Western LowFERS.

It is now 1900 UT December 10th. My chart receiver on 76.2 kHz is still hotter than a pistol. I'm hearing AZ, C, and traces of MAX! I have never heard such propagation here. Hope this stuff keeps up.

EK NOTES: Take a look at the beacon status list and note the proliferation of MedFer stations! These 100 mW stations are really getting out -- reception reports over 600 miles! I may have one on the air pretty soon myself. Herb Vanderbeek is building a transmitter/keyer which I hope to get on the air from my QTH in the near future. I've already got seven antennas on the roof, so what the heck!

For the first time in several years of publication we've decided to increase the WESTERN UPDATE subscription price. Creeping inflation on materials and copy costs dictate that we go to $1 per issue or $10 per year. We're not here to make money on this publication, but I think it makes sense to stay even, or slightly ahead of the game financially. This helps cover the cost of printer paper and ink cartridges for the computer, miscellaneous office supplies, WESTERN UPDATE-related telephone bills, and occasional small donations to projects managed by serious Experimenters.

Amateur radio Experimenter Nets and schedules continue to be a time-efficient method of information sharing. With the coming of winter, the West Coast Sunday morning SSB net on 3927 kHz at 7:30 A.M. is becoming increasingly bothered by foreign broadcast and other QRM. For the next few months, it may be more effective to concentrate on the Thursday evening sked on the same frequency starting at about 8 P.M. Let's give it a try and see what happens!

We have two pieces of sad news to report. **Al Taylor** of Whitehorn, California became a silent key on November 23rd. And, we learned from **Dave Stinson** that he lost his bride **Talyha Marie Stinson** in a head-on collision November 11th with an 18-wheeler which was attempting to pass on a blind curve near Pahrump, Nevada. Dave was seriously injured, but is recovering, and is now at home. If you know Dave from the LowFER Conventions, or personal correspondence, consider giving him a call. He's ready to talk to his friends.

MAILBAG: **Cliff Buttschardt** ("C" Morro Bay, CA) reports that he now has some excess solar capacity at his beacon site which could support an additional experimental beacon. Any takers?

Randy Seden (ELU) is looking forward to winter-time DX and writes, "**PLI, FPV** and myself are still meeting every Saturday morning at 10:00 A.M. LSB. One of these days I hope our group will grow! "

A note from **Steve Ratzlaff** in late November: "Just back from several days in Elgin, Oregon. Got in some great whistler and LowFER/MedFER listening! I got six different good whistler recording sessions done before vandals stole my antenna and feedline. I copied the following beacons between November 23rd and 26th: **C, 7FS, D/U, SS, G4, TI, U, MER (1683.8 and 1686.1 kHz)**, and **SD**. I used two 400-foot wires laid on the ground. Sure beats an active whip! Also, please note my change of address to Mountain View."

Montie Fisher (WA5TSL of Oklahoma) wrote to say, "After twenty-two years of amateur radio and a number of years as a SWL in grade school before that, I still find LF and VLF activity among the most intriguing and esoteric areas in radio. I'm always eager to learn more about LF/VLF goings on, and WESTERN UPDATE consistently is a first-rate source of information."

New subscriber **Bill Rausch** (AA6PA of Palo Alto, CA) says, "Please enter my subscription for the WESTERN UPDATE. I've purchased a SAM-1 transverter from **Dave Curry** in Burbank, and hope to have it working with my Yaesu FT-767 soon. The call will be **6PA**. Simultaneously, I'm trying to get on HF packet on the ham bands, and would like to hear from other local LowFERS who would like to try and set up a LF packet net."

Wit Wisniewski of Tucson, Arizona asked, "What are the rules for submitting articles to WESTERN UPDATE?". That's easy, Wit! Put a fresh ribbon in your typewriter or printer and bang out some copy! For drawings and schematics, use a

black pen. If you submit photos, try to make 'em black and white...they copy better. If it's legible and interesting, I'll print it!

Anthony Griffith of McMinnville, TN, is "...still looking for parts for a transmitter, and I hope to be on 175 kHz using the ID letters '**AAL**' soon. I want to use AM when I'm not operating as a beacon. I hope to talk an uncle into building a transmitter after I'm on the air so that I can try voice experiments. I am also interested in BPSK."

Lynn Ashley of Arlington, VA is SysOP of the LongWave DataBase System (LWDBS), and wrote to say that WESTERN UPDATE is now posted on the bulletin board under "Newsletters & Magazines." A note to Lynn: Be certain that the listing reflects our recent price increase to $10 a year. And, thanks!

Dave Johnson (WA4NID of Gainesville, FL) reports, "I have a MedFER and LowFER transmitter, and am arranging to put these into operation in Middleburg, Florida with the help of a friend. Also, I'm going to be experimenting with a LowFER transmitter on top of a 12 story building here in Gainesville. My main problem is getting an antenna to perform efficiently. You see, my apartment is on the 11th floor of a 12 floor building (different from the one previously mentioned) in which I'm not allowed to put up ANY outdoor antennas. I use dipoles on the balcony for 20 thru 10 meter ham bands, but I am frustrated in attempts to get out a decent signal on 30, 40 and 80 meters. The problem is getting a good RF ground. I am hoping you can publish in the WU a plea for help in my search for a small antenna for 1750 meters which does not require a good ground. Shouldn't a properly designed and constructed loop antenna perform adequately, even if its physical size was small enough to fit inside my apartment? I'd like to hear from ANYONE who has tackled a similar problem. I used to have a KILLER longwire on top of the building. Now that management has forced me to dismantle it, I find that I can get nearly as good reception using the LW converter from **Curry Communications**. It's great, and I recommend it."

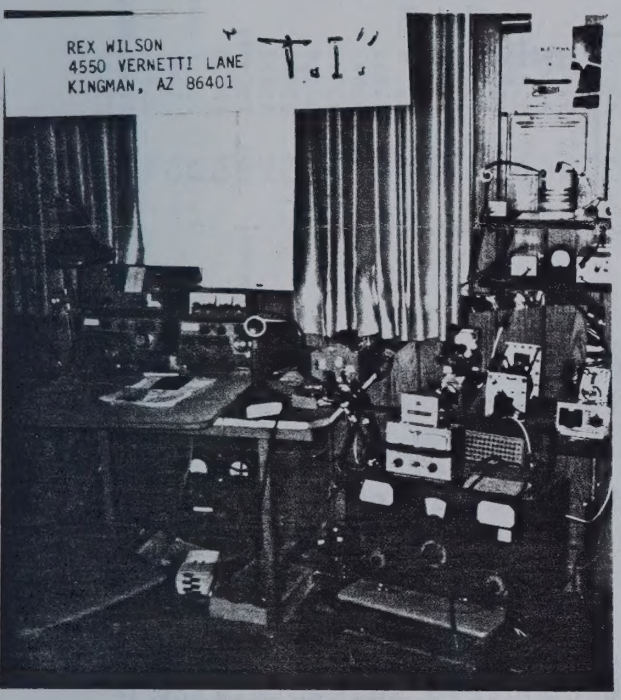
Allan Egleston is still looking for used radio equipment (beacon stuff, and 10/15/20/160m ham). Allan is on a very limited budget, and will be happy with old equipment in working condition.

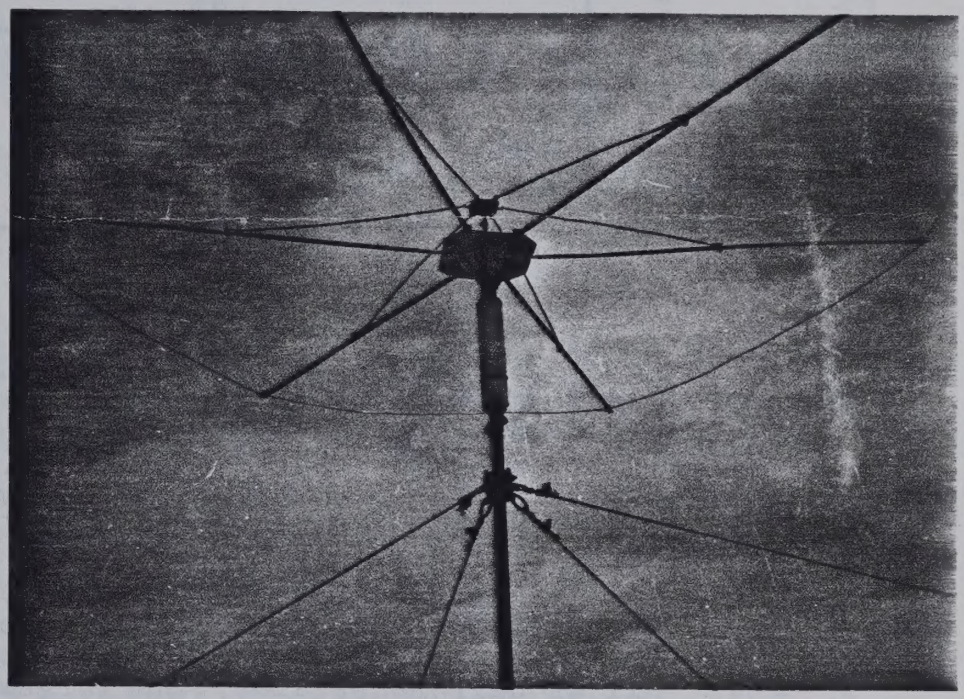
Bob Cutter (KIØG, CO, Colorado) says, "I have found that keeping three beacons going is just too much work. Accordingly, I have dropped the MedFER and 160m beacons and will concentrate on the LowFER for this winter. The MedFER beacon was a mixed success. I copied it in Grand Junction about 90 miles west. However, other than the report from your area last winter, I had no others. I hope the quake had some positive effect on you people, like improved return paths! Did those of you monitoring by chart notice anything interesting?" Ed. note: No, we didn't, Bob. At the time of the earthquake my chart recorder was hooked to 76.2 kHz, but their transmitter was off the air. **Mike Mideke** (115 miles south of the epicenter) didn't notice anything on his 48.5 kHz chart recorder. However, there was an article in the December 8th San Francisco Chronicle about researchers at Stanford University reporting some strange ULF phenomena beginning some three hours before the SF quake. No more details at this time.

George Trinkaus sent along an interesting catalog of kits, plans, and books for electronics and communications, and includes quite a few 1750m items...transmitter, converter, active antenna, etc. Write to **Panaxis Productions**, P.O. Box 130, Paradise, CA, 95967-0130. (916) 534-0417.

Rex Wilson (TI, Kingman, Arizona) and **Herb Vanderbeek** (G, G4 Palo Alto, California) worked each other November 24th using CW on the MedFER band (a first, as far as I know!). Shame on Herb for sending CW to Rex at 30 wpm! Give us slowpokes a break! Rex also had a 1650.67 kHz contact recently with **Frank Cathell** in San Diego. Rex called Frank on CW, and the only way Frank could answer was to key his power on and off a few times (Frank does not yet have hand keying capability).

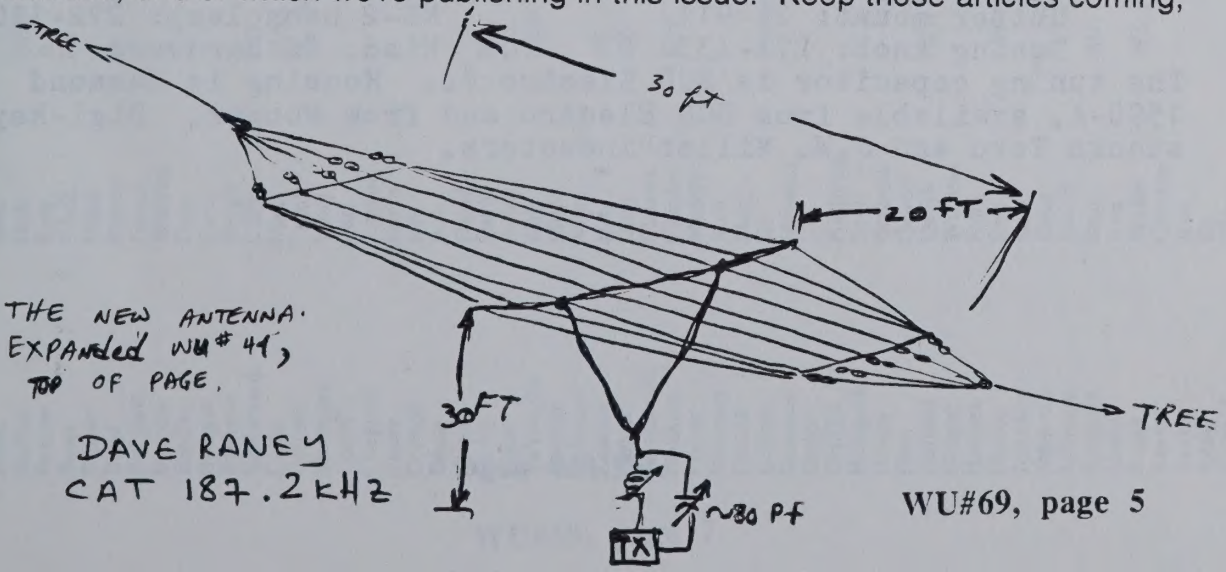
Frank recently visited Rex and sent along a new litz loading coil, which has increased the TI near-field signal strength by an estimated 6 dB. Rex reports, "My reception on MedFER includes **D, H,** and **SD. Mark Mallory's D & U** at 1620± are also in here nightly. I also hear Greg Farkas **AZ**. I will soon verify his new **TUS**, if I can. I have tried quite a few times for Bob Cutter's **CO** MedFER (but not often enough, apparently) to no avail. I'll get him off a letter, which I told him I would write to try to set up a schedule." Rex sent along the photos below. On the left is his radio shack. The photo on the right is his MedFER antenna, sporting a top hat 84-inches in diameter. The antenna is mounted on the 35x65 foot metal roof of his mobile home.





Dave Raney (WC8E/CAT 187.2) writes to announce his LowFER beacon ID change from **UPN** to **CAT**. His new antenna (shown below) comes right from a nostalgia page of WU #41, page 5. Dave says, "Initial impressions are that the new antenna works just fine, both transmitting and receiving. **BA** (200 miles) is almost S9 on the meter. **9HDQ** (85 miles) is S9 + 40 dB, and **KRY** (235 miles) came up to S8. I recently had a spontaneous QSO with **KRY** on LF at 1125 EST November 5th. This was our first-ever two-way."

Thanks to **Dave Johnson** of Los Banos, California for the nice letter describing his new beacon on 178.572 kHz. Dave enclosed several camera-ready circuit articles, one of which we're publishing in this issue. Keep those articles coming, folks!

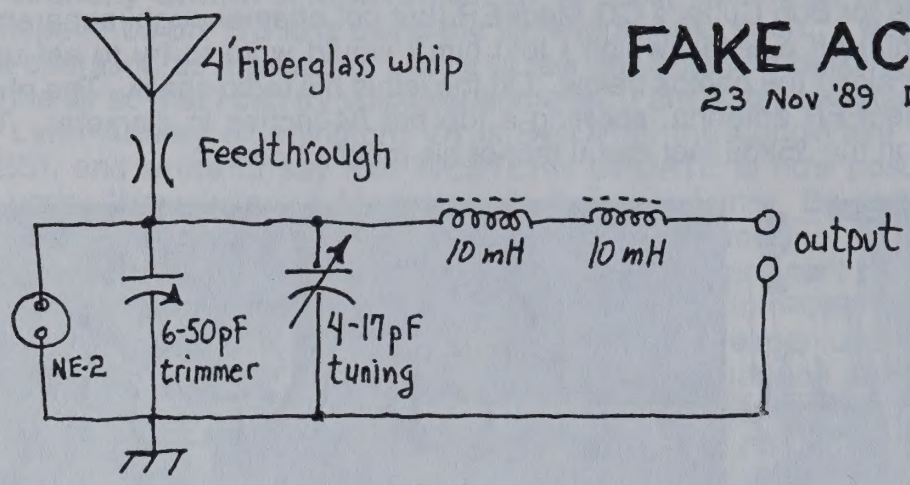


THE NEW ANTENNA. EXPANDED WU # 41, TOP OF PAGE.

DAVE RANEY
CAT 187.2 kHz

FAKE ACTIVE WHIP

23 Nov '89 D.E. Johnson



This "fake active whip" covers the LOWFER band and is so hot that it will raise the noise floor of my receiver even in a quiet location. The components are mounted in a small cast aluminum box that attaches to a car gutter mount. This design is not optimum-- it's what I slapped together with what I had at the moment. If anyone wants to build one, I recommend the following changes:

1. You will probably want to use some kind of coaxial connector (for instance BNC) rather than the binding posts.
2. Don't use two 10 mH inductors. Use four or five inductors all of different value, the largest about 10 mH, totalling about 30 mH. This will improve AM broadcast band rejection due to self-resonance of the coils, and make setting the trimmer cap easier to get the coverage into the LOWFER band.
3. Use an output transformer to provide a better match to the impedance of your receiver. I recommend a TOKO I.F. transformer, Digi-key #TK-1305, with an extra 1500 pF across the primary. Take the output from the secondary, the tap on the primary, or the high side of the primary, which ever gives best results.

The following parts are Radio Shack:

Antenna: 21-934	Trimmer cap: 272-1340
Feedthrough: 29-950	Binding posts: 274-662
Gutter mount: 21-911	NE-2 neon lamp: 272-1101
Tuning knob: 274-433	Misc. #4 hardware

The tuning capacitor is BCD Electro #4. Housing is Hammond 1590-A, available from BCD Electro and from Mouser. Digi-key stocks Toko and J.W. Miller inductors.

WESTERN UPDATE ACTIVE LIST as of December 3, 1989

Anderson	Brice	BA	W9PNE	PO Box 14	Lancaster	IL	62855	(618)299-2441
Armstrong	Lloyd			3813 Lancaster Drive	Pueblo	CO	81005-3065	
Ashley	Lynn			2401 N. Vernon St.	Arlington	VA	22207	(703)522-5308
Babcock	David		WA6EBH	2940 Cheyenne Road	Riverside	CA	92506	
Bahr	Leland	LEE	W0VT	914 Golden Bear Lane	Kingwood	TX	77339-2914	(713)359-5284
Baker	Brad			21024 Bear Creek Road	Los Gatos	CA	95030	
Balfour	Herb	OHH	VE3OHH	91 Elgin Mills Road West	Richmond Hill (Canada)	ONT	L4C4M1	(416)884-5355
Barlow	Ron	A	N4GJV	Route 1, Box 297	Cleveland	NC	27013	
Bauer	Frank	FB	W6FPO	PO Box 1086	Felton	CA	95018	(408)335-7392
Bittner	Mike			27215 Sunnyridge Road	Palos Verdes	CA	90274	
Bond	Robert		WD6BCN	1420 McLoughlin Avenue	Oxnard	CA	93035	(805)985-0159
Borglum	James			5549 Lesa Road	La Mesa	CA	92041	(619)464-3250
Bowers	William			11542 South Kirkwood	Stafford	TX	77477	(713)530-4364
Bradley	Dave		W6CUB	PO Box 2043	Freedom	CA	95019-2043	
Bumpus	Carle			930 Idylberry Road	San Rafael	CA	94903	
Burhans	Ralph			161 Grosvenor Street	Athens	OH	45701	(614)593-8207
Buttschardt	Cliff	HDO, C	W6HDO	950 Pacific Street	Morro Bay	CA	93442-2327	(805)772-2132
Carter	Max	MAX		46 - 14th Street	Wheatland	WY	82201	(307)322-9439
Cathell	Frank	H2, SD	K3YAZ	PO Box 535	Descanso	CA	92016	(619)445-8167
Chalmers	Doug			450 Adobe Place	Palo Alto	CA	94306	
Chaplin	Carl		W7Q0	Box 2800	Minden	NV	89423	
Chappell	Vernon			4511 - 36th Street #6	San Diego	CA	92116	
Coote	James	J	WB6AAM	808 North Ave. 66	Los Angeles	CA	90042	(213)258-7490
Cornell	Ken		W2IMB	225 Baltimore Avenue	Pt. Pleasant Beach	NJ	08742	
Costa	Bob		KB6QXM	P.O. Box 600	Redwood Estates	CA	95044	(408)353-3656
Cripe	David			7908 Wellesley Court	Pasadena	MD	21122	
Curry	David	PLI	WD4PLI	852 N. Lima Street	Burbank	CA	91505	(818)846-0617
Cutter	Robert	CO	KI0G	701 19th Street	Glenwood Springs	CO	81601	
DeVaughn	Bob	NBD	K3NBD	829 Estella Street	Pittsburgh	PA	15210	(412)488-1479
Dorman	Mike			15635 21st Ave. SW	Seattle	WA	98166	(206)246-3796
Egleston	Allan			20601 Resort Road	Sonora	CA	95370	(209)532-7111
Ericson	Jim	EK	KG6EK	226 Charles Street	Sunnyvale	CA	94086-6063	(408)773-8947
Farkas	Greg	AZ	AK7Y	PO Box 17074	Tucson	AZ	85731-7074	(602)749-4796
Farnsworth	Charles			506 Rutledge Drive	Lodi	CA	95240	
Faulkner	Charles	FPV	W6FPV	15844 McKeever	Granada Hills	CA	91344	(818)366-6210
Fisher	Montie		WA5TSL	808 Brett Drive	Edmond	OK	73013	
Forsman	Stan			1312 Burrows Road	Campbell	CA	95008	(408)374-2129
Fornek	Stan		K9IXC	640A Rance Road	Oswego	IL	60543	
Gelinas	Ed	T (dashes)	WA6AJY	557 N. Bayview	Sunnyvale	CA	94086	
Gosenca	Michael			203 Cherry St.	Eaton Rapids	MI	48827	
Grater	Jim			1136 S. Johnson St.	Lakewood	CO	80226-5113	
Griffith	Anthony			117 White St.	McMinnville	TN	37110	
Hedspeth	Scott	N3S	WB4YZA	Route 4, Box 227	Mocksville	NC	27028	(704)284-4021
Helms	Bernard			4210-1 Walnut	Berrien Springs	MI	49103	
Herr	George			6690 Vista Del Mar #1	Playa Del Rey	CA	90293	
Holland	David	DCH	K3YAY	300 South Main Street	Berlin	MD	21811	
Hooper	William		KF6AR	366 S. El Monte Road	Los Altos	CA	94022	
Hoopes	John			1084-B Sergeants Drive	Robins AFB	GA	31098	
Horton	Bob	MSG	W6MSG	2 Fresno Street	Paso Robles	CA	93446	(805)238-2250
Johnson	Dave		WA4NID	PO Box 389	Gainesville	FL	32602	
Johnson	Dave	F, DJ		713 Texas Ave.	Los Banos	CA	93635	(209)826-0841
Johnson	David		WB7ACG	PO Box 15646	Rochester	NY	14615-0646	(716)235-1104
Johnson	Don	AU	W9TIF	3304 Roxford	Champaign	IL	61821	(217)398-4020
Jones	Ron		K7RJ	9241 S. Toni Lee Circle	West Jordan	UT	84088	(801)561-2685
Jones	Wallie	WJ	W6SZQ	9090 Nagle Ave.	Arleta	CA	91331	(818)892-0552
Kassel	Charles			114 Church Drive	Mastic Beach	NY	11951	
Keeley	Roy		KC4IMC	Route 3, Box 316 Salt Air Rd.	Theodore	AL	36582	(205)973-2516
Keller	Eb			2984 Fallwood Lane	San Jose	CA	95132	(408)263-6229
Kincaid	Nilan		W6EIG	5529 W. 140th Street	Hawthorne	CA	90250	(213)643-5269
Kraus	Howard		K2UD	372 Callodine Avenue	Amherst	NY	14226-2971	(716)838-2406
LaGrua	Michael			Box 549	Caspran	MI	49915-0549	
Layer	Hal		N6SPD	PO Box 27676	San Francisco	CA	94127	(415)661-6958
Lee	Mitchell	MEL	KB6FPW	172 North 24th Street	San Jose	CA	95116	(408)298-3026
Lehrbaum	Rick		AC1I	3275 Stockton Place	Palo Alto	CA	94303	

Leonardelli	John		VE3IPS	Box 722, Station A	Downsview (Canada)	ONT	M3M3A9	(416)636-3300
Lingwall	John			PO 70, 1025 Trinidad	Calhan	CO	80808	
Mallory	Mark	MPM, D, U	WB7CAK	5196 Cobblecreek Road #7K	Salt Lake City	UT	84117	
Manley	Dean		KH6B	2058 Ainaola Drive	Hilo	HI	96720-3638	(808)959-8257
Marshall	Dave			440 Larry Drive	Florissant	MO	63033	
Martin	Steve		NK3R	141 Bridgecreek Drive	Goose Creek	SC	29445	(803)797-3143
Mawhinney	Scott	T (dashes)		295 Pettis Avenue	Mountain View	CA	94041	(415)960-1041
Maxwell	James		W6CF	PO Box 473	Redwood Estates	CA	95044	(408)353-2094
McGreevy	Steve	RR	N6NKS	45 Elda Drive	San Rafael	CA	94903	(415)479-4259
Mideke	Mike	Z2	WB6EER	Box 123	San Simeon	CA	93452-0123	
Morgan	Robert			2817 West St. anne	Rapid City	SD	57702	
Mussler	Mike			Bonanza Star Route	Nederland	CO	80466	
Nickerson	Rick	R	KB6JQU	3224 Saxonville Way	Sacramento	CA	95842	(916)348-1466
Norman	Charles			4938 Spirit Court	Stone Mountain	GA	30087	
Olson	Keith	7FS	W7FS	E. 15470 Highway 106	Belfair	WA	98528	(206)275-2560
Osterud	Jim			519 Capri Circle	Tooele	UT	84074	
Otacilio P. de Sousa	Jose`			Rua Calisto 62, Recanto dos Vinhais	Sao Luis, MA, Brasil, PR8BNP		65070	
Owens	James	Q	NW00	1363 Tipperary	Boulder	CO	80303	
Palermo	George			1444 First Street, Suite A	Sarasota	FL	34236	(813)365-7777
Paschal	Ev			Sinclair Island	Anacortes	WA	98221	
Pelmulder	Jim		N6PTM	2801 Gravenstein Highway	Sebastopol	CA	95472	
Pepe	Bill		WA2TDR	Box 1915	Bloomfield	NJ	07003	
Peterson	Art			851 31st Street	Richmond	CA	94804	(415)234-2014
Phillips	Ed	IZJ	W6IZJ	408 North Alabama Street	San Gabriel	CA	91775	(818)285-8308
Pomplun	Don		K2BIO	521 Van Buren Place	San Ramon	CA	94583	(415)829-7648
Post	Kendall			1842 Hoffman Street	Madison	WI	53704	(608)244-0500
Raney	David	CAT	WC8E	4128 Linden Avenue	Cincinnati	OH	45236	(513)791-0740
Rappold	Sam	ZYK	WB6ZYK	PO 1267/479 Briceland Road	Redway	CA	95560	
Ratzlaff	Steve	SR	AA7U	295 Pettis Ave.	Mountain View	CA	94041	(415)965-7623
Rausch	Bill		AA6PA	820 Warren Way	Palo Alto	CA	94303-3627	(415)327-4662
Raven	Gregory	TEXAS	KF5N	4550 Sunnybank Court	Fort Worth	TX	76137	(817)485-6771
Reid	Frank		W9MKV	Box 5283	Bloomington	IN	47407-5283	
Remington	Sheldon	HO	NI6E	PO Box 2094	Pahoa	HI	96778	(808)966-6946
Roberts	Todd	ABC	WD4NGG	PO Box 21413	Hilton Head Island	SC	29925	(803)681-8114
Schick	D.H.			580 N. Buena Vista Dr.	Lake Alfred	FL	33850	
Seabury	Tom			PO 535	Diablo	CO	94528	
Seamons	John	JKS	KF6VO	95 Holstein Road	San Anselmo	CA	94960	(415)456-6090
Seden	Randy	ELU, U	WD6ELU	1272 Harold Avenue	Simi Valley	CA	93065	(805)583-5687
Skillin	Boyd	B	K6MGX	3876 East Pico	Fresno	CA	93726	(209)222-0275
Smith	Glen		N6CX	220 Laurel, POB 475	Kenwood	CA	95452	
Smith	Randy			19515 Frederick Rd. #135	Germantown	MD	20874	
Snow	John		N6AMZ	3708 Judah Street	San Francisco	CA	94122-1227	
Spaulding	Fred		K1YQP	883 San Simeon Drive	Mountain View	CA	94043	(415)961-5018
Spencer	Chris	FAW	WB7FAW	722 West 1850th North	Orem	UT	84057	(801)225-7852
St. Angelo	Michael		N2MS	61-16 80th Avenue	Glendale	NY	11385	
Statom	Mike			1604 S. Campbell Avenue	Alhambra	CA	91803	(818)289-7170
Stewart	Don			2617 Anza Street	Bakersfield	CA	93305-3109	(805)871-7024
Stinson	Dave	R	AB5S/7	HCR 65, Box 71053	Pahrump	NV	89041	(702)727-4370
Sullivan	John			2069 Touraine Lane	Half Moon Bay	CA	94019	
Taylor	*Al*			*Became Silent Key 11/23/89*	*Whitethorn*	*CA*	*95489*	
Taylor	Bill			327 Camino Del Campo	Redondo Beach	CA	90277	(714)378-5628
Thompson	Arliss	XU	W7XU	Route 1, Box 52	Colton	SD	57018	(605)446-3687
Tracy	John		WB7AMC	10431 Miller Ave.	Cupertino	CA	95014	(408)257-9585
Trinkaus	George			P.O. 532	Claremont	CA	91711	
Turner	Clint	CT	KA7OEI	145 West Street	Pleasant Gap	PA	16823	(814)359-2663
Vanderbeek	Herb	G4	WY6G	630 Ashton Avenue	Palo Alto	CA	94306	(415)493-1726
Vandermaaten	Jim	SM	WB6QZL	1276 Tourney Drive	San Jose	CA	95131	(408)258-6872
Waldsmith	Gary	SUK	K4SUK	1441 Hound Hollow Road	Pilot Hill	CA	95664	(916)933-3815
Weiss	Jim		W9ZMV	c/o Radio WTAQ	LaGrange	IL	60525	(312)579-9104
Welch	James		KK6N	3071 Mauricia Avenue	Santa Clara	CA	95051	
Wilson	Rex	TI	KB7TI	4550 Vernetti Lane	Kingman	AZ	86401	(602)757-3649
Wisniewski	Wit			1421 N. Sarnoff Drive	Tucson	AZ	85715	(602)721-8412
Wright	Rick	1SUN	KA5YWH	Box 4181, Station A, SEOSU	Durant	OK	74701	(405)924-3699
Wyatt	Frank		N6FW	855 Ticonderoga Drive	Sunnyvale	CA	94087	(408)737-8155